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eleventh century, we find the Mohammedan religion also adopted by the royal family of Bórnú. For everywhere civilization and Islám migrate together hand in hand with commerce, and the sixteenth century, which was the period of the prime of the kingdom of Songhay as well as of that of Bórnú, was also the time when Mohammedan learning flourished most on the Niger as well as on the Komádugu-near Birni.

X.—*Killimandjaro and the White Nile*. By JAMES MACQUEEN,
Esq., F.R.G.S.

Read, May 9, 1859.

MOST unreasonable doubts have been raised and propagated regarding the mountain called Killimandjaro, in Eastern Africa, rising above the limits of eternal snow. Other idle speculations bring the parent stream of the White Nile from that great mountain. It is, however, as certain that Killimandjaro is largely capped with snow, as it is that the sources of the Bahr el Abiad or White Nile lie at a considerable distance from the former, and can have no connection with it. Unquestionable authorities establish these important points.

Mr. Rebmann performed three journeys from Rabbai Impey, near Mombas, into the interior. The first journey, in 1848, he reached the Bura or Taita range of hills, rising, as he states, from 4000 to 6000 feet above the level of the sea. The Bura mountains are seven days' journey from Rabbai (*Church Missionary Intelligencer*, Oct. 1852, p. 275), and these hills or ranges are three days' journey in breadth. They rise from a waterless plain, abound with springs and streams; and have the finest climate in the world. "I felt," says Mr. Rebmann, "when in that country, as if I walked on the Jura mountains in the canton of Basle, so cool was the air and so beautiful the country. I walked over the hills and dales of Taita, in Eastern Africa, not very distant from the equator, as easy and happy as there; the lofty mountains with their luxuriant vegetation, and the manifold songs of the birds, praised the Creator with myself," &c. (No. 17, Sept. 1856, p. 394.)

The distance from the sea to these hills is about 100 British miles, and their breadth say 20 miles, together 103 geo. miles. The route travelled was about w. by n. From the Kadiaro Point in these hills Mr. Rebmann first saw Killimandjaro and its snowy summits, May 11th, 1848. He states that from Bura Taita he took a bearing of Killimandjaro, which was *due* n.w. From Bura he set out, December 6th, 1849, for Madjame; and at

the end of three days and a distance of 80 miles, crossing in their route several rivers, reached Kislema (always ascending). On the 4th of January, 1849, left Kislema, went N.W. 6 or 8 miles (gradually rising), at which point they were about 18 miles distant from the foot of the mountain. Here at night the cold (though under cover) was as great as in Europe in November, being there so near the snow mountain, which he could well distinguish by the dim light of the moon. The spot where he slept could not be more than 5 or 6 miles from the snow. On the 5th of January he continued the journey as before (N.W.), but soon altered the direction to W., which was his course thenceforward till they reached Madjame. The province of Uru, which they entered, affords very little level land, it being greatly intersected by valleys, from 1500 to 2000 feet in depth, through which perennial streams, supplied from the Snow Mountain, found their way. In one day and a half from Kislema to Madjame (at one place in this route he was only from 3 to 4 miles from Killimandjaro) passed several rivers with pretty large volumes of water, they being on an average five inches deep and five yards broad.

From Uru the distance to Mount Killimandjaro was 5 or 6 miles; but this distance is most difficult to pass, from the rugged nature of the country, and may take a day and a half to do it. From Uru he saw Madjame fully, because it lies lower. It extends between the S.W. foot of Killimandjaro and the N.E. foot of Mount Shuru or Shua, which latter, as he saw, was high enough to be sometimes covered with snow.

There are two summits rising to the limits of snow out of the common mountain mass. The eastern is lower, and terminates in several peaks, which during the rainy season are often and very far down covered with snow, but during the day and in the dry season it will sometimes entirely melt away, while at other times a few spots will remain. The western summit is the perpetual snow mountain, which, rising considerably above its neighbour, affords much more room for the snow, it being formed like an immense dome. It is 10 or 12 miles distant from the eastern summit, the intervening space presenting a saddle-like appearance, which, so far as I know, is never covered with snow. About 10 miles to the S. of Uru I saw a lower mountain like the Shuru, separate from the Jagga and mountain mass named Usuma Na-Masai. It stretches from N. to S., or rather from S.E. to N.W., for about 18 miles. It in fact forms part of a range extending far away to the southward. The natives said that when they put the white matter taken from Killimandjaro into a calabash near a fire it became water, and also that when they attempted to bring a mass of it from the mountain to show the king it became water before they got it down to the village. During a period of two months in this journey Mr.

Rebmann saw Killimandjaro every day whenever the sky was clear. Returning by Uru, he passed within 3 miles of the mountain; and Dr. Krapf, in his repeated journeys to Ukambane, saw it daily, whenever the sky was clear, for months together. It had in its snow-capped dome the appearance of the snow-clad mountains which he saw in January on his way to Laybach and Trieste. Dr. Krapf visited Ukambane twice, in 1849 and again in 1850. The country lies N.W. from Mombas. On his way he passed the small river Woi, which descends from the northern end of the Taita range, and runs N.E. till it joins the Adi; next, the Tzavo (the waters of which were very cold), a more considerable stream, which descends from the eastern side of Killimandjaro; next, the small river Andaku, another tributary to the Adi; and, after a march of 18 miles, they reached and passed the river Adi, which is the S.W. boundary of Ukambane proper. The breadth of the bed of the river was 170 yards; but the water channel there, November 21st, end of dry season, only about 60 feet, and 1 foot deep. This river comes from the west parts of Kikuyu and the snow-clad mountains of Kenia or Kirenia, and is impassable during the rains. Mount Shuru, in their western journey, hid Killimandjaro from their view, and which latter seems to rest upon the former, though the distance between them was very considerable. As little children when compared to a giant, so are the mountains of Taita and others, though 6000 feet high; so, adds Dr. Krapf, is Killimandjaro, as contrasted with them in height.

From the Adi they marched N. by Yata to Kitui, the capital or residence of Kivoi, and always ascending. The cold (December) near Yata was intense. The country of Ukambane is very elevated. The river Dana is 4 days' journey from Kitui; and there, when reached, was (in the dry season) from 150 to 200 yards broad, and 6 or 7 feet deep, and free from obstructions by rocks downwards to the sea. The river Dana comes from the snow-capped Mount Kenia. Dr. Krapf repeatedly saw these snow-clad mountains. The nearest rose like a saddle, with pinnacles on it, like two horns. It bore by compass from Kitui N.W. by W., or say true N.W. Beyond, to the W.N.W., appeared another snow-clad mountain, which seemed of equal height, and, because it was seen at a very small angle, it must have been at a considerable distance from Kenia. Dr. Krapf saw the snow on this mountain when the sky was clear, the distance being 11 or 12 days' journey—at least 120 miles. Several rivers issue from this high land, and run to the eastward. On the N.W. side there was a river called Tumbiri, which was stated to run N., to the country of the white people, and the end of which was not reached after 100 days' journey. This, no doubt, was the White Nile, called Tubiri by Werne, as we shall by-and-by see when we come to examine the authorities about its

source and course of the rivers, taken to the N.W. of these high mountains by the Egyptian expedition and the explorers of that famous stream. Mr. Erhardt says there is a large salt lake, called Barengo, running N.E. from Mount Kenia; and both Dr. Krapf and Rebmann tell us that from a lake called Lukoya, near the N.W. foot of the Mount Killimandjaro, a river flows N.E. to the Adi. All these points considered, and given from such good authority, show not only that the White Nile does not come from Killimandjaro, as some theorists make it, nor from any point to the S. of the equator, as will be further established by other equally clear, if not still clearer authorities. The Pangany river, it may be here remarked, springs from the S.W. base of Killimandjaro, and is augmented by the streams springing from that mountain, and all those rising in and westward from the Taita range.

Dr. Krapf was told at Kitui by an Uimba chief who had been at the foot of Mount Kenia, that the white matter upon it turned into water as it descended from the mountain, that the natives never ascended it on account of the extreme kiria or cold, and also that beyond it to the N.W. was a road leading to Roum, or Turkey in Asia, or the Turkish Empire, called by the Arabs Roum. He also tells us that Uimba is 2 days' journey N. from the river Dana, and that Kenia is the western termination of the Kikuyu mountain-range.

Turning to the White Nile, we have its course correctly delineated by the expedition sent to explore it by Mahomet Ali, the ruler of Egypt, in 1839 and 1840, from Khartoum upwards, through its very winding course, to $3^{\circ} 30'$ N. lat. and 31° E. long. from Greenwich. In every day's progress, the width of the river, the depth of the river, the current of the river, the distance run in miles, and the state of the thermometer, are regularly marked. Its great tributary, the river Seboth, or Red River, which comes in its main streams from Enarea and Kaffa, is clearly marked. Where it joins the Baro, 9° N. lat., it is 1100 feet broad, its banks higher and current greater than the Nile. The lake No, or Couir, through which on its E. side the river runs, lies in $9^{\circ} 16'$ N. lat., and 29° E. long. A large river from the W. joins the Nile by this lake. The country is very level all the way to the point where the expedition was, on the 26th January, 1840, stopped for want of water, the river having fallen so much, that the vessels had only from 3 to 6 feet water, the breadth being about 1370 feet. There the bed began to get rocky. The vegetation around had completely changed, and the trees and foliage here were like those of Europe, and continued ranges of hills began to cover the country in every direction, rising to greater and greater height towards the S. Lokono, the king of Bari, told them that the river came from the S.E., its sources being at a distance of one month's journey,

which may be taken at 25 days' actual travelling, and in a great mountain, according to his description vastly overtopping all its neighbours. The stream, he said, was first formed by the union of four small rivers descending from the mountain. Werne, who accompanied the second expedition, received similar information, and that the river, in its early and most southern course, was called the Tubiri, most certainly the Tumbiri of Dr. Krapf. Werne also gives the same distances, and the names of many of the mountain ranges which he saw and heard of, and a description of many of the tribes that dwell among them, and intimating that at a very great distance beyond the mountains where the river rises there were white people, like the crews of the Turkish vessels, which people could only be the Arabs of the E. coast about Brava, Melinda, &c. Werne says he went about 20 miles beyond the point where the rapids existed, when they were compelled to turn back. Dr. Knoblecher states that at Loquek he found it 650 feet broad, and from 5 to 8 feet deep, in the dry season. The country round Loquek was very beautiful, and the population, generally speaking, a fine race of men, robust and well made. The districts on both banks of the river abound in very fine iron, which the inhabitants manufacture into various articles, useful and ornamental.

The best description of the river above the point mentioned, almost to its sources, is that given by Don Angelo, who visited this quarter in 1852, and during the dry season. His starting position is one degree too far N. I retain the lat., $3^{\circ} 30'$, given by the commander of the Egyptian expedition, though the Frenchmen who accompanied him in his second expedition, in the following year, want to make it out that they reached a higher point in the latter ($4^{\circ} 40'$) than he did in the former. It is considered not worth while to show their error ignorantly or carelessly made, for when we find the long. $31^{\circ} 18'$ E., certainly the most difficult and delicate point to ascertain, retained by those men, as it was originally given by Selim, it forms proof that both latitude and longitude as given in the first voyage were correct. From $3^{\circ} 30'$ N. lat.* and $31^{\circ} 2'$ E. long. to the point where the source of the main stream is stated, and in fact shown to be, 330 geo. miles, it is obvious that there is abundant space to form a river even much larger than the Bahr el Abiad is found to be. It is possible—nay, it may be taken as certain—that it receives some tributaries from the S.W., though none of these can be very large.

About 20 miles above Loquek the bearing of the river turns nearly 30 miles W.S.W., having in the preceding distance passed a

* The astronomical observation was made in $3^{\circ} 30'$ N. lat.: river there 1700 feet broad: but the expedition went about ten geographical miles farther S.; river there 1370 feet broad.

high rock in the middle of the stream. On the n.w. bank dwell the tribe of Oouingara. At the point mentioned is the great cataract of *Garbo*, from whence the river turns its bearing, first to E.S.E. and next to the S.E., upwards, it may be said, to its source. The cataract of *Garbo* is great and impassable, and is in about $2^{\circ} 40'$ N. lat. About 60 miles beyond this is *Robengo* (capital of *Kuenda*), and one day's journey beyond it is the village of *Lokoya*, where the Nile is joined by a considerable stream, formed by two rivers descending from the E. side of the great mountain of *Kimborate*, 25 miles S.E. Beyond *Lokoya* the Nile or stream is only a small rocky river, springing from a group of elevated mountains, some days' journey, say 3 or 4, beyond the tribe of *Padongo*, to the eastward or south-eastward of *Kimborate*. The different rivers that join the Nile in its early course, and the tribes that dwell around them, are all marked on the map, which renders it unnecessary to particularise them here. About half-way between the cataract of *Garbo* and *Rohenga* the river is so reduced in size, that in the tribe of *Mudas* it is crossed by a bridge formed of a tree thrown across it. The bed of the river is very rocky and the water very shallow in all these parts above *Garbo*. East of the river the whole country is cut by high mountains. Those of the *Imadone* especially are very high, and form part of that chain which separates the *Gallas* from the black races; and they are also remarkable as giving rise to the river *Sabaut* or *Seboth*, and its confluent the *Calhia*. Those rivers run first from N.E. to S.W., and then N. The negroes trade with the *Gallas*, and others among these mountains, in gold-dust. The map will point out fully the range of mountains, and the rivers which descend from *Kaffa Souro* and the *Kenia* range, all running to the south-eastward, and into the Indian Ocean. Beyond the *Padongo* the country is marshy, and there is a river named *Diria* running from W. to E.

Here it may be observed that all the rivers and places to the S. of *Enarea* and *Kaffa*, along the course of the *Malo* or *Great River*, are laid down from specific journeys made and given by Arab and native travellers, as these have been collected by *Bruce*, *Harris*, *Krapf*, *D'Abbadie*, &c. These, therefore, as here delineated, may be assumed as tolerably correct.

From a very early period of history the most attentive writers have uniformly stated that the mountains round the sources of the Nile were covered with perpetual snow. *Ptolemy* states this pointedly. *Bruce* heard that this was the case; so did *Major Harris*; and also that the hills of *Souro* to the S. of *Kaffa*, in about 3° to 4° N. lat., were always covered with snow. *Krapf* heard this also of the mountains in these parts when he was in *Shoa*; and finally he states that the mountains around the sources

of the White Nile were covered with perpetual snow.* Why should this excite either doubt or surprise, when we find the hills in Abyssinia, such as Simien, on the n. of Gondar, rising above the limits of snow, and around the sources of the Tacazze, Pearce found the hills covered with hoar-frost every morning, and the cold exceedingly great? The ancients also placed the sources of the Nile about the equator, for we find the priest of the temple of Minerva in Egypt telling Herodotus that one-half of the waters of Africa ran to the s., and the other half to the n. But, though snow-clad hills covered the mountains round the sources of this far-famed stream, only a few simpletons taught that the melting of those snows occasioned the flood or swelling of the Nile. All the snows on them were and are but a drop in the bucket compared to the real cause, namely, the tropical rains, when the sun returns to the northern torrid zone, during which time the snow falls most heavily. We now know well the cause, nor was that cause unknown to the ancient world. In Lucan's 'Pharsalia' we find the venerable priest Achoreus describing, in the beautiful language of Roman poetry and Eastern ideas, to the great and renowned chief Julius Cæsar, the real cause of the flooding of the Nile, namely, the tropical rains from the accumulated clouds collected and condensed near the equator and in the northern torrid zone, as we find is really the case. Julius Cæsar was so anxious to learn the position of the sources and phenomena of the Nile, that he said to gain that knowledge he would relinquish the civil war. He sat with Achoreus a whole night in Alexandria discussing these points, while the venerable priest pointedly told him that the flood of the Nile proceeded neither from the softened cold of Boreas nor dissolving snow, but from heavy rains only. The whole passage in Lucan (book x.) is beautiful and instructive, and well worth the perusal. Take the following:—

————— " *Spes sit mihi certa videndi
Niliacos fontes ; bellum civile relinquam.
Finierat, contraque sacer sic orsus Achoreus :
Fas mihi, magnorum, Cæsar," &c.
" Vana fides veterum, Nilo, quo crescat in arva,
Æthiopum prodesse nives. Non Arctos in illis*

* A few years ago a Captain Short, in the naval service of the Imaum of Muscat, informed me that he went up the river Jub 210 miles, and at the point reached he saw in the distance to the w. a long line of a snow-clad mountain range running apparently from s. by w. to n. by e. His distance to the nearest point of this range is about 260 miles. Now the chain of mountains in question cannot be less than 20,000 feet high, if not more. The elevation of 5000 feet gives a view to the extent of 84 miles, consequently 20,000 feet will afford a scope of 316 miles ; so that Short could readily see the range he mentions from the point on the Jub which he reached. In his account we have a remarkable and satisfactory proof of the accuracy of the previous information which told us that great mountains covered with perpetual snow stood in that quarter of Africa.

Montibus aut Boreas. Testis tibi sole perusti
 Ipse color populi, calidique vaporibus Austri.
 Adde, quod omne caput fluvii, quodcumque soluta
 Præcipitat glacies, ingresso vere tumescit
 Prima tabe nivis: Nilus neque suscitât undas
 Ante Canis radios, nec ripis adligat amnem
 Ante parem nocti, Libra sub iudice Phœbum."

It is a singular and a most unaccountable thing how Ptolemy should have committed such gross errors in his latitudes in southern central Africa, while in the more northern parts of Africa within the torrid zone we find him not materially wrong, and that in his longitude we find him to be remarkably correct. Thus Alexandria he places in $60^{\circ} 30'$ E. long., and Lake Coloe or Tzana 69° —a difference of $7^{\circ} 30'$. Now Alexandria, according to our reckoning, is in $29^{\circ} 51' 28''$ E. long., and the centre of Lake Tzana in $37^{\circ} 20'$ E. long.—a difference of $7^{\circ} 28' 32''$. In like manner he places the eastern branch of the White Nile in 65° E. long., making a difference of 4° between it and Lake Coloe. Now, deducting 4° from $37^{\circ} 20'$, we have $33^{\circ} 20'$ as the position of the eastern branch of the White Nile; coming again, as Ptolemy tells us, very near to what is probably the truth. The source of the E. branch we find from Ptolemy to be $4^{\circ} 30'$ E. of Alexandria; and if we add $4^{\circ} 30'$ to $29^{\circ} 52'$, we shall have the source of this branch in $34^{\circ} 22'$ E. long., near the point where it really is. Again, we have the Lake Couir or No nearly in the meridian of Alexandria, as Ptolemy has placed it. In the Latin text the longitude of this lake is $60^{\circ} 30'$, or $29^{\circ} 15'$ W. of Alexandria—the difference only $15'$. It is needless to follow such comparisons further.

In reference to the term "Mountains of the Moon," it is of no consequence what that name is intended to convey; sufficient for our purpose in these latter days is to show that immense high mountains covered with perpetual snow do stand round the head of the White Nile. In reference further to the position where Ptolemy has placed them, namely, 12° S. lat., and his eastern lake in 7° S. lat., it would almost appear that, by some greatly erroneous information, he had got hold of the high lands to the S. of the lake called N'Yassa, the lake being much farther N.; and thus that lake will be his eastern lake, and Lake Ujiji or Taganyenka is his western lake, or western source of the western branch of the Nile, about 8° separate, and his lake at the junction of the two streams, 5° farther N. than his first lake, is in 2° S. lat., where we are told there is a lake; and thus we have his errors and his features of Africa in this portion of that continent made out. Wherever ancient geographers found a lake, they were sure to carry a river out of it; and if they found another lake in the course they gave this river, they were sure to carry this river to it and from it. In this respect many moderns followed their example.

It requires only an inspection of the accompanying map to show any inquirer or observer, not only the true sources of the Nile, especially of the White Nile, and that these cannot be to the s. of the equator, nor have any connection with Killimandjaro, nor the rivers in Kaffa and Enarea, which, with the exception of the more remote sources of the Seboth river, all run s.e. into the Indian Ocean.

Some very curious and important information connected with the countries near the sources of the Nile has just been received from a French missionary (R. P. Leon), dated at Zanzibar, August, 1858. This missionary had been in Enarea. He states that there is a frequented road from Brava on the sea-coast to Kaffa, the journey occupying 24 days. This, by native estimation, is about 15 miles daily; but they never actually travel more than 10 miles on an average. The estimated distance is 360 geo. miles, which is tolerably accurate. Twelve days' journey s. of Kaffa, he states, dwell a people called Amara, nearly, or it may be said, white. They have written books, and a language different from either the Éthiopic or Arabic. They build houses and villages, and cultivate the ground. They are rightly conjectured to be the remains of Christian nations, which in early times spread far to the s. of Abyssinia, till they were overrun, massacred, or scattered by the savage Galla. It has been repeatedly asserted that such remnants of Eastern Christian churches were scattered over this portion of Africa. Four days' journey from the Amara Mr. Leon says there is a lake from which an affluent of the White Nile is seen to flow. Mr. Leon supposes this to be the source of the Seboth, but it is more probable that it is the main stream of the Nile.

The Amara, he says, dwell between 2° and 3° n. lat., and have some tribes of copper-coloured people, who dwell near the equator, subject to them. No Mussulman can venture to enter this country.

XI.—*Journeys of Silva Porto with the Arabs from Benguela to Ibo and Mozambique through Africa.* Nov. 26th, 1852, to January 22nd, 1853, and from June 9th, 1853, to August, 1854. By JAMES MACQUEEN, Esq., F.R.G.S.

Read, June 27, 1859.

THIS Portuguese trader has, it appears from his own account, made more than one journey from Benguela into the interior—one to Cutonge, and another to a very considerable distance beyond it to the eastward. In his third and most important journey he was accompanied by some Arabs, who had come from the Zanzibar